## CLAIMS

What is claimed is:

1. A multistage space-efficient electrostatic collector for cleaning a gas flowing therethrough along a gas flow path comprising a first stage comprising a first corona discharge zone along said gas flow path, and a second stage comprising a second corona discharge zone along said gas flow path and spaced along said gas flow path from said first corona discharge zone.

2. The multistage space-efficient electrostatic collector according to claim 1 comprising a corona discharge electrode and two ground planes, said first corona discharge zone being between said corona discharge electrode and the first of said ground planes, said second corona discharge zone being between said corona discharge electrode and the second of said ground planes.

3. The multistage space-efficient electrostatic collector according to claim 2 wherein said second ground plane comprises a canister extending axially along an axis, and said corona discharge electrode comprises a hollow drum in said canister and extending axially along said axis, said first corona discharge zone being inside said drum, said second corona discharge zone being outside said drum.

4. The multistage space-efficient electrostatic collector according to claim 3 wherein said first ground plane is inside said drum.

5. The multistage space-efficient electrostatic collector according to claim 2 wherein each of said corona discharge electrode and said second ground plane is annular, and each of said first and second corona discharge zones is an annulus.

6. The multistage space-efficient electrostatic collector according

to claim 5 wherein said second ground plane and said second corona discharge zone and said corona discharge electrode and said first corona discharge zone are concentric.

7. The multistage space-efficient electrostatic collector according to claim 6 wherein said first corona discharge zone concentrically surrounds said first ground plane.

8. The multistage space-efficient electrostatic collector according to claim 7 wherein said corona discharge electrode concentrically surrounds said first corona discharge zone, said second corona discharge zone concentrically surrounds said corona discharge electrode, and said second ground plane concentrically surrounds said second corona discharge zone.

9. The multistage space-efficient electrostatic collector according to claim 8 wherein said first ground plane is annular and defines an initial gas flow zone therethrough along said gas flow path and spaced along said gas flow path from said first and second corona discharge zones, and wherein said first ground plane concentrically surrounds said initial gas flow zone.

10. The multistage space-efficient electrostatic collector according to claim 1 wherein gas flow along said gas flow path changes direction between said first and second corona discharge zones.

11. The multistage space-efficient electrostatic collector according to claim 10 wherein said change of direction is 180°.

12. The multistage space-efficient electrostatic collector according to claim 1 wherein gas flow along said gas flow path flows in a first flow direction

along said first corona discharge zone and then reverses direction and flows in a second flow direction along said second corona discharge zone, said first and second corona discharge zones being concentric to each other, said second flow direction being parallel and opposite to said first flow direction.

13. The multistage space-efficient electrostatic collector according to claim 12 wherein said second corona discharge zone surrounds said first corona discharge zone.

14. The multistage space-efficient electrostatic collector according to claim 1 wherein said gas flow path comprises an initial gas flow zone directing gas flow therethrough prior to gas flow through said first corona discharge zone.

15. The multistage space-efficient electrostatic collector according to claim 14 wherein said initial gas flow zone is a non-corona-discharge zone.

16. The multistage space-efficient electrostatic collector according to claim 14 wherein said gas flow path is a serpentine path comprising said initial gas flow zone, said first corona discharge zone and said second corona discharge zone.

17. The multistage space-efficient electrostatic collector according to claim 16 wherein said gas flow path comprises a first flow reversal zone between said initial gas flow zone and said first corona discharge zone, and a second flow reversal zone between said first corona discharge zone and said second corona discharge zone.

18. The multistage space-efficient electrostatic collector according to claim 17 wherein gas flows in a first flow direction along said initial gas flow zone, then reverses and flows in a second flow direction along said first corona discharge

zone, then reverses and flows in a third flow direction along said second corona discharge zone, said second flow direction being parallel and opposite to said first and third flow directions.

19. The multistage space-efficient electrostatic collector according to claim 14 wherein said initial gas flow zone and said first corona discharge zone and said second corona discharge zone are concentric.

20. The multistage space-efficient electrostatic collector according to claim 19 wherein said second corona discharge zone surrounds said first corona discharge zone, and said first corona discharge zone surrounds said initial gas flow zone.

21. An electrostatic collector comprising a canister extending axially along an axis between an inlet end and an outlet end and having an inwardly facing inner wall providing a first collector electrode, a corona discharge electrode in said canister comprising a hollow drum extending axially along said axis and having a plurality of corona discharge elements, said drum having an outer wall facing said inner wall of said canister and defining an outer annular flow passage therebetween, said drum having an inner wall defining a hollow interior, a hollow tubular post extending from said inlet end of said canister axially into said canister and axially into said hollow interior wall of said drum, said post having an outer wall facing said inner wall of said drum and defining an inner annular flow passage therebetween, said outer wall of said post providing a second collector electrode, said post having an inner wall defining a hollow interior providing an initial flow passage, wherein gas to be cleaned flows in a first axial direction along a first flow path segment through said initial flow passage along said hollow interior of said post, then flows in a second opposite axial direction along a second flow path segment through said inner annular flow passage along said outer wall of said post and said inner wall of said drum, then

flows in said first axial direction along a third flow path segment through said outer annular flow passage along said outer wall of said drum and said inner wall of said canister.

22. The electrostatic collector according to claim 21 wherein said corona discharge elements comprise a plurality of inner discharge tips protruding radially inwardly into said inner annular flow passage toward said outer wall of said post such that said inner discharge tips protrude into said second flow path segment.

23. The electrostatic collector according to claim 22 wherein said corona discharge elements further comprise a plurality of outer discharge tips protruding radially outwardly into said outer annular flow passage toward said inner wall of said canister such that said outer discharge tips protrude into said third flow path segment.

24. The electrostatic collector according to claim 21 wherein said outer annular flow passage is concentric to and radially outward of said inner annular flow passage, and said inner annular flow passage is concentric to and radially outward of said initial flow passage.

25. The electrostatic collector according to claim 24 wherein said gas flows in a serpentine flow path through said canister, including a first U-shaped bend between said first and second flow path segments, and a second U-shaped bend between said second and third flow path segments.

26. A method for increasing residence time within a corona discharge zone of gas flowing through an electrostatic collector comprising directing gas flow along a first corona discharge path in said electrostatic collector and then directing gas flow along a second corona discharge path in said electrostatic collector.

27. The method according to claim 26 comprising changing the direction of gas flow between said first and second corona discharge paths.

28. The method according to claim 27 comprising changing the direction of gas flow between said first and second corona discharge paths by 180°.

29. The method according to claim 26 comprising directing gas flow in a first flow direction along said first corona discharge path, then reversing the gas flow and directing gas flow in a second flow direction along said second corona discharge path, said first and second discharge paths being concentric to each other, said second flow direction being parallel and opposite to said first flow direction.

30. The method according to claim 29 wherein said second corona discharge path surrounds said first corona discharge path.

31. The method according to claim 26 comprising directing gas flow along an initial flow path in said electrostatic collector prior to directing gas flow along said first corona discharge path.

32. The method according to claim 31 comprising providing said initial flow path as a non-corona-discharge path.

33. The method according to claim 31 comprising directing gas flow in a serpentine path through said electrostatic collector comprising said initial flow path, said first corona discharge path and said second corona discharge path.

34. The method according to claim 33 comprising performing a first flow reversal between said initial flow path and second first corona discharge path,

and performing a second flow reversal between said first corona discharge path and said second corona discharge path.

35. The method according to claim 34 comprising directing gas flow in a first flow direction along said initial flow path, then reversing gas flow and directing gas flow in a second flow direction along said first corona discharge path, then reversing gas flow and directing gas flow in a third flow direction along said second corona discharge path, said second flow direction being parallel and opposite to said first and third flow directions.

36. The method according to claim 31 comprising providing said initial flow path and said first corona discharge path and said second corona discharge path concentric to each other.

37. The method according to claim 36 comprising surrounding said first corona discharge path with said second corona discharge path, and surrounding said initial flow path with said first corona discharge path.